What is claimed is:

1. A second stage pressure reducer for two-stage scuba regulators, comprising:

a gas supply chamber, communicating with a mouthpiece;

an elastic diaphragm, having an inner face that delimits said gas supply chamber and that seals said gas supply chamber from the external environment, and having an outer face that is exposed to external hydrostatic pressure;

an inlet, having a proximal end that is connected to said gas supply chamber and a distal end that is connected to a first stage pressure reducer, said proximal end containing a valve orifice, and said first stage pressure reducer being in turn connected to a source of breathing gas;

a tubular element, contained in said gas supply chamber and conveying said gas from said inlet through said orifice into said gas supply chamber;

a poppet stem, housed inside said tubular element and having the same longitudinal axis as said tubular element, said poppet stem further having a body of smaller radial size than said tubular element;

a poppet seat, affixed to that end of said poppet stem that faces said orifice, said poppet seat causing said orifice to close when said poppet seat is driven into contact with said orifice and causing said orifice to open when said poppet seat is removed from contact with said orifice;

a poppet spring, connected to that end of said poppet stem that is opposite to said poppet seat, said poppet spring causing said poppet stem to slide along said tubular element away from said orifice when said poppet spring is compressed;

centering tabs, protruding from said poppet stem and causing said poppet stem to retain a constant axial position within said tubular element, said centering tabs further allowing said poppet stem to slide axially within said tubular element;

first means for preventing said poppet stem from rotating about said poppet stem's longitudinal axis, said first means further allowing said poppet stem to slide axially; and

a demand lever, having a first end and a second end, said first end being in contact with said diaphragm and being caused to move by movements of said diaphragm, and said second end being joined to said poppet stem, thereby causing said poppet stem to slide as a consequence of movements of said first end.

2. A second stage pressure reducer as in claim 1, wherein the first means for preventing the poppet stem from rotating about the longitudinal axis of said poppet stem restrain at least one of the centering tabs while allowing said tabs to slide in the direction of said longitudinal axis.

3. A second stage pressure reducer as in claim 2, wherein the tabs being restrained have a radial length in excess of the distance between said poppet stem and the inner wall of the tubular element, and wherein each of said tab or tabs is engaged in a longitudinal groove on said inner wall, said groove running in a direction parallel to the axis of said tubular element and preventing a rotation of said poppet stem, said groove further allowing said poppet stem to slide in the axial direction of said poppet stem.

4. A second stage pressure reducer as in claim 3, wherein at least one of the tabs engaged in the longitudinal grooves is further restrained by one or two longitudinal ribs running parallel to said grooves, said ribs being situated in the proximity of said tabs and projecting inwards from the inner surface of said tubular element.

5. A second stage pressure reducer as in claim 4, wherein the peripheral edges of the tabs are substantially flush with the inner surface of the tubular element.

6. A second stage pressure reducer as in claim 2, wherein the tabs being restrained are each slidably engaged in guides on the inner wall of the tubular element, said guides being formed by pairs of longitudinal ribs running in a direction parallel to the axis of said tubular element, said ribs projecting inwards from the inner surface of said tubular element and said ribs being spaced at a distance substantially equal to but not smaller than the thickness of said tab.

7. A second stage pressure reducer as in claim 2, wherein the peripheral edges of the tabs being restrained include one or more throats in a longitudinal direction parallel to the axis of the tubular element and wherein the inner wall of said tubular element includes inward projecting ribs, said inward projecting ribs having shapes, numbers and positions that match and that slidably engage said throats.

8. A second stage pressure reducer as in claim 2, wherein the poppet stem has two tabs only.

9. A second stage pressure reducer as in claim 8, wherein the second end of the demand lever is engaged to one or both of the tabs, and wherein movements of the

elastic diaphragm cause a movement of the poppet stem due to the engagement of said demand lever with said tabs.

10. A second stage pressure reducer as in claim 9, wherein the demand lever is engaged in one or more longitudinal slots on the tabs.

11. A second stage pressure reducer as in claim 8, wherein the two tabs are oriented in diametrically opposite positions with reference to the poppet stem.

12. A second stage pressure reducer as in claim 8, wherein rotation of the poppet stem is prevented by two ribs that project inward from the inner wall of the tubular element, one of said ribs being positioned adjacent to the clockwise side of one of said tabs and the other one of said ribs being positioned adjacent to the counter-clockwise side of the other one of said tabs.

13. A second stage pressure reducer as in claim 8, further including second means for engaging the poppet spring in position against the poppet stem, said second means being separate from the tabs.

14. A second stage pressure reducer as in claim 13, wherein the second means comprise one or more ridges extending from the body of the poppet stem, said ridges having radial axes that are transverse or perpendicular to the radial axes of said tabs.

15. A second stage pressure reducer as in claim 13, wherein the second means comprise one or more ridges extending from the body of the poppet stem, and wherein at least one of the tabs extends from said ridges, said tab having the same radial axis as said ridges and said tab being situated in the same axial portion of said poppet stem as said ridges.

16. A second stage pressure reducer as in claim 15, wherein the second means consist of two ridges extending from the body of the poppet stem, and wherein each tab extends from one of said ridges, said tabs having lengths different from said ridges and said tabs being offset from each other in relation to the longitudinal axis of said poppet stem.

17. A second stage pressure reducer as in claim 15, wherein the ridges and the tabs extending from said ridges have substantially the same longitudinal length.

18. A second stage pressure reducer as in claims 15, wherein the two tabs are in contact with the second end of the demand lever.

19. A second stage pressure reducer as in claims 15, wherein the second end of the demand lever is engaged to one or both of the tabs, whereby movements of

the elastic diaphragm cause a movement of the poppet stem due to the engagement of said demand lever with said tabs.

20. A second stage pressure reducer as in claim 2, wherein the poppet stem has three centering tabs, each of said tabs having a radial axis that either intersects the longitudinal axis of said poppet stem or that lies in a longitudinal plane that is secant or tangent to the body of said poppet stem.

21. A second stage pressure reducer as in claim 20, wherein two of the three tabs lie in substantially the same plane and are substantially opposite to each other.

22. A second stage pressure reducer as in claim 2, wherein each of the tabs is a single longitudinal extension from the poppet stem and wherein the length of said longitudinal extension is the same for all of said tabs.

23. A second stage pressure reducer as in claim 2, wherein each of the tabs is a single longitudinal extension from the poppet stem and wherein at least one of said tabs is of different longitudinal length.

24. A second stage pressure reducer as in claim 2, wherein within a longitudinal plane that contains the axis of the poppet stem or that is secant or tangent to said poppet stem, more than one tab is provided, said tabs being longitudinally spaced from each other.